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EXAMINER	
HOLDER, ANNER N	

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2621	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/811,960	Applicant(s) PURI, ATUL
	Examiner Anner Holder	Art Unit 2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-34 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-5,11-14,16,17,19-23,25-31,33 and 34 is/are rejected.

7)☒ Claim(s) 6-10,15,18,24 and 32 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 03/30/04 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :12/28/07;03;30/06; 07/08/05; 11/22/04; 07/29/04.

DETAILED ACTION

Drawings

1. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 29 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Allowable Subject Matter

4. Claims 6-10, 15, 18, 24, and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: a median calculator coupled to the storage unit, to calculate a median of a last three quantizer selections, a

quantizer rounder, coupled to an output of the linear regression unit, an estimate validity unit to determine, when the picture type signal indicates a P picture, whether the output of the linear regression unit is a valid value, and a second selector, having inputs coupled to outputs of the median calculator and the quantizer rounder, an output coupled to an output of the quantizer estimator and controlled by the estimate validity unit; the quantizer estimate Q.sub.I is given by: 14 Q l = b T I - a , where a and b are the coefficients; the quantizer estimate for a P picture is given as: 16 Q P = b T p - a , where Q.sub.p is the quantizer estimate of the P picture, T.sub.p is a target bitrate calculated for the P picture and b and a are coefficients derived from a set of previous quantizer selections and previous coding rates (respectively Q and S) according to: 17 a p + S - bQ - 1 b p = (S) (Q - 1) - n (S _) (Q - 1 _) (Q - 1) 2 - n (Q - 1) 2 _ .

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 11, 13, 14, 17, 22, and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda et al. (Fukuda) US 6,532,262 B1 in view of Chiang et al. (Chiang), A new rate Control Scheme Using Quadratic Rate Distortion Model, IEEE, 1996, pgs. 73-76.

7. As to claim 1, Fukuda teaches a linear regression unit to generate a quantizer estimate from input values of prior quantizer selections and coding rates, [Fig. 1; Col. 8 Lines 40-58; Abstract] first memory to store predetermined values of quantizer selections and coding rates, the table indexed by a complexity indicator signal, [Fig. 1; Col. 8 lines 40 - Col. 9 lines 6; Col. 9

Lines 17-27] second memory to store quantizer selections and coding rates of previously coded P pictures, [Fig. 1; Fig. 9; Fig. 11; Col. 8 lines 40 - Col. 9 lines 6; Col. 9 Lines 17-27; Col. 9 Lines 28-31; Col. 10 Lines 43-53] and a selector selectively coupling an input to the linear regression unit to the first memory when a picture type signal indicates an I picture and to the second memory when the picture type signal indicates a P picture. [Fig. 1; Fig. 9; Col. 9 Lines 28-31; Col. 10 Lines 43-53]

Fukuda does not specifically teach linear regression in determining quantization parameters.

Chiang teaches linear regression in determining quantization parameters. [Abstract; 1. Introduction ¶ 1; 5. Rate Control for the MPEG-4 Coder]

It would have been obvious to one of ordinary in the art at the time invention was made to incorporate the linear regression teachings of Chiang with the device of Fukuda improving image quality and coding efficiency.

8. As to claim 11, Fukuda teaches for an I picture, estimating a quantizer according to a upon assumed values of quantizers and coding rates, the assumed values derived from a complexity indicator of the I picture, [Fig. 1; Fig. 3; Abstract; Fig. 2; Col. 12 lines 59-61] for a P picture, estimating the quantizer according to the upon values of quantizers and coding rates of prior P pictures, and for a B picture, selecting the quantizer estimate from a maximum of quantizer selections of two most-recent P pictures. [Fig. 1; Fig. 3; Abstract; Fig. 2; Col. 9 lines 53-65; Col. 10 lines 43-53]

Fukuda does not specifically teach linear regression analysis in determining quantization parameters.

Chiang teaches linear regression analysis in determining quantization parameters. [Abstract; 1. Introduction ¶ 1; 5. Rate Control for the MPEG-4 Coder ¶ 1]

It would have been obvious to one of ordinary in the art at the time invention was made to incorporate the linear regression teachings of Chiang with the device of Fukuda improving image quality and coding efficiency.

9. As to claim 13, Fukuda (modified Chiang) teaches retrieving the assumed quantizer and coding rate values from a table based on the complexity indicator of the I picture. [Fukuda - Fig. 8; Fig. 9; Col. 17 lines 6-19]

10. As to claim 14, Fukuda (modified Chiang) teaches the complexity indicator represents spatial complexity of the I picture. [Fukuda - Fig. 8; Fig. 9; Col. 17 lines 6-19]

11. As to claim 17, Fukuda (modified Chiang) teaches for a P picture, the linear regression analysis derives a quantizer estimate from a target bitrate assigned to the P picture. [Chiang - Abstract; 1. Introduction ¶ 1; 5. Rate Control for the MPEG-4 Coder; Fukuda - Fig. 1; Fig. 9; Fig. 11; Col. 8 lines 40 - Col. 9 lines 6; Col. 9 Lines 17-27; Col. 9 Lines 28-31; Col. 10 Lines 43-53]

12. As to claim 22, Fukuda teaches for a new P picture: performing a quantizer values and coding rates for a predetermined number of previously coded P pictures, [Fig. 1; Fig. 2; Abstract; Col. 8 lines 40-66; Col. 9 line 53-65] generating a first quantizer estimate for the new P picture based on the and with reference to a target coding rate assigned to the new P picture, generating a second quantizer estimate for the new P picture as a median of a second predetermined number of the previously coded P pictures, based on a difference between the first quantizer estimate and a quantizer of a most recently coded P picture, selecting one of the first or the second quantizer

estimates as a final quantizer estimate for the P picture. [Fig. 1; Fig. 2; Abstract; Col. 8 lines 40-66; Col. 9 line 53-65; Col. 10 Lines 43-53]

Fukuda does not specifically teach linear regression analysis in determining quantization parameters.

Chiang teaches linear regression analysis in determining quantization parameters. [Abstract; 1. Introduction ¶ 1; 5. Rate Control for the MPEG-4 Coder ¶ 1]

It would have been obvious to one of ordinary in the art at the time invention was made to incorporate the linear regression teachings of Chiang with the device of Fukuda improving image quality and coding efficiency.

13. As to claim 27, Fukuda teaches for an I picture: deriving coefficients for based on a complexity indicator of the I picture, performing based on the coefficients, and generating a quantizer estimate for the I picture and with reference to a target coding rate assigned to the I picture. [Fig. 1; Col. 8 Lines 40-58; Abstract]

Fukuda is silent as to linear regression analysis.

Chiang teaches linear regression analysis. [Abstract; Pg. 73 3. Interframe Rate Control ¶ 1; Pg. 75 5. Rate Control for the MPEG-4 Coder ¶ 1]

It would have been obvious to one of ordinary in the art at the time invention was made to incorporate the linear regression teachings of Chiang with the device of Fukuda improving image quality and coding efficiency.

14. As to claim 28, Fukuda (modified Chiang) teaches the deriving comprises referring the complexity indicator to a lookup table of coefficient values. [Fukuda – Col. 3 lines 43-55]

15. As to claim 29, Fukuda (modified Chiang) teaches the lookup table stores values as shown in FIGS. 20A and 20B.

16. As to claim 30, see the discussion of claim 13 above.

17. As to claim 31, see the discussion of claim 14 above.

18. Claims 2, 4, 16, 20, 21, 23, 25, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda et al. (Fukuda) US 6,532,262 B1 in view of Chiang et al. (Chiang), A new rate Control Scheme Using Quadratic Rate Distortion Model, IEEE, 1996, pgs. 73-76 and further in view of Hanamura et al. (Hanamura) US 6,587,508 B1.

19. As to claim 2, Fukuda (modified Chiang) teaches the limitations of claim 1.

Fukuda (modified by Chiang) is silent as to select a maximum value of two previous quantizer selections, wherein the first selector selectively enables the second selector when the picture type signal indicates a B picture.

Hanamura teaches to select a maximum value of two previous quantizer selections, [Fig. 8; Fig. 9; clearly state wherein the first selector selectively enables the second selector when the picture type signal indicates a B picture.]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hanamura teachings with the device of Fukuda (modified Chiang) allowing for improved coded of image.

20. As to claim 4, Fukuda (modified Chiang and Hanamura) teaches the second memory has depth for storage of only three sets of quantizer selections and coding rates. [Hanamura - Figs. 8-12, clearly shows bitrate and quantization are stored]

21. As to claim 16, Fukuda (modified Chiang) teaches the limitations of claim 11,

Fukuda (modified Chiang) teaches does not specifically teach the target coding rate T_i is determined by: $T_i = \max [R/(1 + (N_P X_P/X_I K_P) + (N_B X_B/X_I K_B)), \text{bitrate}/8 * \text{picture rate}]$, where R represents a number of bits allocated to code a group of pictures in which the I picture resides, N_P and N_B respectively represent the number of P and B pictures that appear in a group of pictures, X_I and X_P respectively represent complexity estimates for the I and P pictures in the group of pictures, K_P and K_B determine relative bit allocations between P and B pictures in the group of pictures. bitrate represents the number of bits allocated for coding of the group of pictures, and picture rate represents the number of pictures in the group of pictures.

Hanamura teaches the target coding rate T_i is determined by: $T_i = \max [R/(1 + (N_P X_P/X_I K_P) + (N_B X_B/X_I K_B)), \text{bitrate}/8 * \text{picture rate}]$, where R represents a number of bits allocated to code a group of pictures in which the I picture resides, N_P and N_B respectively represent the number of P and B pictures that appear in a group of pictures, X_I and X_P respectively represent complexity estimates for the I and P pictures in the group of pictures, K_P and K_B determine relative bit allocations between P and B pictures in the group of pictures. bitrate represents the number of bits allocated for coding of the group of pictures, and picture rate represents the number of pictures in the group of pictures. [Col. 5 lines 18-39; Equation 11]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hanamura with the device of Fukuda modified by Chiang to achieve coding efficiency.

22. As to claim 19, Fukuda (modified Chiang) teaches the limitations of claim 11.

Fukuda (modified Chiang) teaches does not specifically teach the target bitrate T.sub.p is given as: TP = max [R (N P + N B K P X B K B X P) , bitrate 8 * picture rate] , where R

represents a number of bits allocated to code a group of pictures in which the P picture resides, N.sub.P and N.sub.B respectively represent the number of P and B pictures that appear in a group of pictures, X.sub.P and X.sub.B respectively represent complexity estimates for the P and B pictures in the group of pictures, K.sub.P and K.sub.B determine relative bit allocations between P and B pictures in the group of pictures. bitrate represents the number of bits allocated for coding of the group of pictures, and picture rate represents the number of pictures in the group of pictures.

Hanamura teaches the target bitrate T.sub.p is given as: T P = max [R (N P + N B K P X B K B X P) , bitrate 8 * picture rate] , where R represents a number of bits allocated to code a group of pictures in which the P picture resides, N.sub.P and N.sub.B respectively represent the number of P and B pictures that appear in a group of pictures, X.sub.P and X.sub.B respectively represent complexity estimates for the P and B pictures in the group of pictures, K.sub.P and K.sub.B determine relative bit allocations between P and B pictures in the group of pictures. bitrate represents the number of bits allocated for coding of the group of pictures, and picture rate represents the number of pictures in the group of pictures.

[Hanamura - Col. 5 lines 18-39; equation 12]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hanamura with the device of Fukuda modified by Chiang to achieve coding efficiency.

23. As to claim 20, Fukuda (modified Chiang and Hanamura) teaches testing a quantizer estimate for the P picture to determine if it is valid, and if the P picture's quantizer estimate is not

valid, calculating a substitute quantizer estimate as a median of a predetermined number of quantizers used for previous P pictures. [Hanamura - Fig. 8; Fig. 9; Col. 30 lines 45-55]

24. As to claim 21, Fukuda (modified Chiang and Hanamura) teaches the P picture's quantizer estimate is valid if it falls within a predetermined window of quantizer values and if a difference between the quantizer estimate and a quantizer of a most recently processed P picture is less than a predetermined value. [Fukuda – Col. 3 lines 42-47; Col. 8 lines 28-39; Fig. 1; Hanamura – Fig. 8; Fig. 9]

25. As to claim 23, see the discussion of claim 21 above.

26. As to claim 25, see the discussion of claim 19 above.

27. As to claim 33, see the discussion of claim 16 above.

28. Claims 3, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda et al. (Fukuda) US 6,532,262 B1 in view of Chiang et al. (Chiang), A new rate Control Scheme Using Quadratic Rate Distortion Model, IEEE, 1996, pgs. 73-76 in view of Hanamura et al. (Hanamura) US 6,587,508 B1 and further in view of Blinn, Quantization Error and Dithering, IEEE Computer Graphics and Applications, 1994, Pgs. 78-82.

29. As to claim 3, Fukuda (modified Chiang and Hanamura) teaches the limitations of claim 2.

Fukuda (modified Chiang and Hanamura) is silent as to a quantizer rounder to round values output by the linear regression unit to a nearest integer.

Blinn teaches a quantizer rounder to round values output by the linear regression unit to a nearest integer. [Pg. 78 Col. 2 ¶ 1]

It would have been obvious to one of ordinary skill in the art at the time the invention to incorporate the teachings of Blinn with the device of Fukuda (modified Chiang and Hanamura) allowing for improvements in image resolution and coding.

30. As to claim 26 see the discussion of claim 3 above.

31. Claims 5, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda et al. (Fukuda) US 6,532,262 B1 in view of Chiang et al. (Chiang), A new rate Control Scheme Using Quadratic Rate Distortion Model, IEEE, 1996, pgs. 73-76 and further in view of Blinn, Quantization Error and Dithering, IEEE Computer Graphics and Applications, 1994, Pgs. 78-82

32. As to claim 5, Fukuda (modified Chiang) teaches the limitations of claim 1.

Fukuda (modified Chiang and Hanamura) is silent as to a quantizer rounder to round values.

Blinn teaches a quantizer rounder to round. [Pg. 78 Col. 2 ¶ 1]

It would have been obvious to one of ordinary skill in the art at the time the invention to incorporate the teachings of Blinn with the device of Fukuda (modified Chiang and Hanamura) allowing for improvements in image resolution and coding.

33. As to claim 12, see discussion of claim 5 above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anner Holder whose telephone number is 571-270-1549. The examiner can normally be reached on M-Th, M-F 8 am - 3 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ANH 02/19/08

TUNG VO
PRIMARY EXAMINER